

Claims

1. Method of bone cement preparation from a polymeric powder and a liquid component, comprising a polymerisable monomer or comonomer by the action of a catalytic system, whereby the particles of said powder component are packed in a powder container (7) with an inlet port (8) and an outlet port (9) and the liquid component is held in a liquid container (11),

characterized in that

A) the liquid container (11) is connected to said inlet port (8); and

B) a vacuum source (10) is connected to said outlet port (9), whereby

C) the void space between said particles of said powder component is flooded by said liquid component, flowing from said inlet port (8) in the direction of said outlet port (9) by the action of the vacuum source (10).

2. Method according to claim 1, characterized in that catalytic system comprises benzoyl peroxide.

3. Method according to claim 2, characterized in that said benzoyl peroxide is contained within said particles.

4. Method according to one of the claims 1 to 3, characterized in that said upstream inlet port (8) and said downstream outlet port (9) of said container (7) allow for the passage of air and liquid, but not of said powder.

5. Method according to one of the claims 1 to 4, characterized in that said container (7) is inflexible, preferably in the form of a syringe (13), with its powder containing compartment (35) completely filled with said powder.
6. Method according to one of the claims 1 to 5, characterized in that said powder in said powder containing compartment (35) is packed to a fractional porosity of 0,30 to 0,43, preferably of 0,34 to 0,38.
7. Method according to claim 6, characterized in that said powder in said powder containing compartment (35) is packed to a fractional porosity of 0,35 to 0,37.
8. Method according to one of the claims 1 to 7, characterized in that said powder component is flooded by said liquid component in 15 to 60 seconds.
9. Method according to claim 8, characterized in that said powder component is flooded by said liquid component in 25 to 35 seconds.
10. Method according to one of the claims 1 to 9, characterized in that the flow of said liquid component is controlled by a valve (12) interposed between said liquid container (11) and said inlet port (8).

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11. Method according to one of the claims 1 to 10, characterized in that flooding of said powder component by said liquid component is followed by swelling, draining of excess liquid component and extrusion of the mixed components.

12. Method according to one of the claims 1 to 11, characterized in that said draining of excess liquid is affected by a piston (39) contained in a vacuum pump (37).

13. Method according to one of the claims 1 to 12, characterized in that said inlet port (8) comprises a mesh (19) which does not allow for passage of said powder particles, but does allow for passage of said liquid.

14. Method according to one of the claims 1 to 13, characterized in that outlet port (9) comprises a narrow gap (25) which substantially blocks passage of said powder particles, but allows for passage of air and said liquid.

15. Method according to claim 14, characterized in that gap (25) is smaller than 50 μ .

16. Method according to claim 14, characterized in that gap (25) is smaller than 3 times the average diameter of said particles of said powder component.

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17. Method according to one of the claims 1 to 16, characterized in that said polymerisable monomer or comonomer comprises methyl-methacrylate, ethyl-methacrylate or butyl-methacrylate or mixtures thereof.

18. Method according to one of the claims 1 to 17, characterized in that vacuum source (10) generates a vacuum in the range of 10 to 200 mbar.

19. Method according to claim 18, characterized in that vacuum source (10) generates a vacuum in the range of 50 to 100 mbar.

20. Bone cement mixture obtained by the method according to one of the claims 1 to 19.

21. Apparatus for performing the method according to one of the claims 1 to 19,

characterized by

A) a powder container (7) with an inlet port (8) and an outlet port (9), said powder container (7) containing a polymeric powder;

B) a liquid container (11), whereby said liquid container contains a liquid component comprising a polymerisable monomer or comonomer; whereby

C) said liquid container (11) is connectable to said inlet port (8);

D) said outlet port (9) is connectable to a vacuum source (10); and;

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E) the void space between said particles of said powder component is floodable by said liquid component through said inlet port (8) in the direction of said outlet port (9) by the action of the vacuum source (10).

22. Apparatus according to claim 21, characterized in that it comprises a vacuum source (10).

23. Apparatus according to claim 22, characterized in that said vacuum source (10) is an evacuated can (44).

24. Apparatus according to claim 22, characterized in that said vacuum source (10) is an evacuated piston (45).

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